

CLAIMS

What is claimed is:

1. A rotating shaft seal assembly comprising:
a shaft supported for rotation within a housing;
a traction drive rotating a seal ring about said shaft at a speed different than said shaft,
and
a plurality of seal elements supported by said seal ring.
2. The assembly of claim 1, wherein said traction drive includes an inner traction ring rotating with said shaft, an outer traction ring fixed to said housing, and a traction ball supported by said seal ring and driven by said inner traction ring.
3. The assembly of claim 2, wherein said inner and outer traction rings include traction grooves, and said traction ball is supported within said traction grooves.
4. The assembly of claim 2, including an inner seal wear insert rotating with said shaft, and an outer seal wear insert fixed to said outer traction ring.
5. The assembly of claim 4, wherein said seal ring includes a plurality of concentric grooves and said seals are disposed within said grooves.

6. The assembly of claim 5, wherein said concentric grooves are disposed on opposing faces of said seal ring.
7. The assembly of claim 6, including a biasing member within each concentric groove for biasing said seal elements against one of said inner and outer seal wear inserts.
8. The assembly of claim 1, wherein each seal element includes an opening to allow a predetermined amount of leakage.
9. The assembly of claim 8, wherein said seal ring includes a first and second face and five concentric rings are disposed on each of said first and second faces, and a seal assembly is disposed in each of said concentric rings and is biased into sealing engagement with one of an inner and outer wear inserts.
10. The assembly of claim 8, wherein said opening in each of said seal elements is different to provide a calibrated amount of leakage.
11. The assembly of claim 2 including a preload biasing member biasing said outer traction ring toward said inner traction ring to provide a desired amount of contact pressure between on said traction ball.

12. The assembly of claim 2, including an intermediate traction ring, an intermediate traction ball, and an intermediate seal ring disposed between said inner and outer traction rings.
13. The assembly of claim 12, including a first drive ring rotating about said seal ring and driven by said traction ball.
14. The assembly of claim 12, including a second drive ring and a thrust ball disposed between said first and second drive rings driving, said thrust ball driving said intermediate seal ring.
15. The assembly of claim 12, including a plurality of intermediate seal rings, along with a plurality of thrust balls, wherein each of said seal rings rotates at a fraction of said shaft speed.

16. A compressor assembly comprising:
- a shaft supported for rotation within a housing;
 - a rotor driven by said shaft within a compressor chamber, said rotor including a compression vane and a vane extension extending from a rear portion of said compression vane;
 - a traction drive supported about said shaft and rotating at a speed different than said shaft, and
 - a seal ring supporting a plurality of seal elements driven about said shaft by said traction drive.
17. The assembly of claim 16, wherein said vane extensions produce a centrifugal field between said housing and said rear portion of said compression vane, said centrifugal field between said housing and said rear portion of said compression vane to reduce pressure of gas traveling toward said shaft.
18. The assembly of claim 16, wherein said traction drive includes an inner traction ring rotating with said shaft, an outer traction ring fixed to said housing, and a traction ball supported by said seal ring and driven by said inner traction ring.

19. The assembly of claim 18, including an inner seal wear insert rotating with said shaft, and an outer seal wear insert fixed to said outer traction ring.

20. The assembly of claim 19, wherein said seal ring includes a first and second face and five concentric rings are disposed on each of said first and second faces, and a seal assembly is disposed in each of said concentric rings and is biased into sealing engagement with one of said inner and outer wear inserts.

21. The assembly of claim 20, wherein each of said seal elements includes an opening, said openings in said seal elements allow a calibrated amount of leakage through said seal.

22. The assembly of claim 21, including an intermediate traction ring, an intermediate traction ball, and an intermediate seal ring disposed between said inner and outer traction rings and a first drive ring rotating about said seal ring and driven by said traction ball.

23. The assembly of claim 22, including a second drive ring and a thrust ball disposed between said first and second drive rings, said thrust ball driving said intermediate seal ring.

24. The assembly of claim 22, including a plurality of intermediate seal rings, along with a plurality of thrust balls, wherein each of said seal rings rotates at a fraction of said shaft speed.